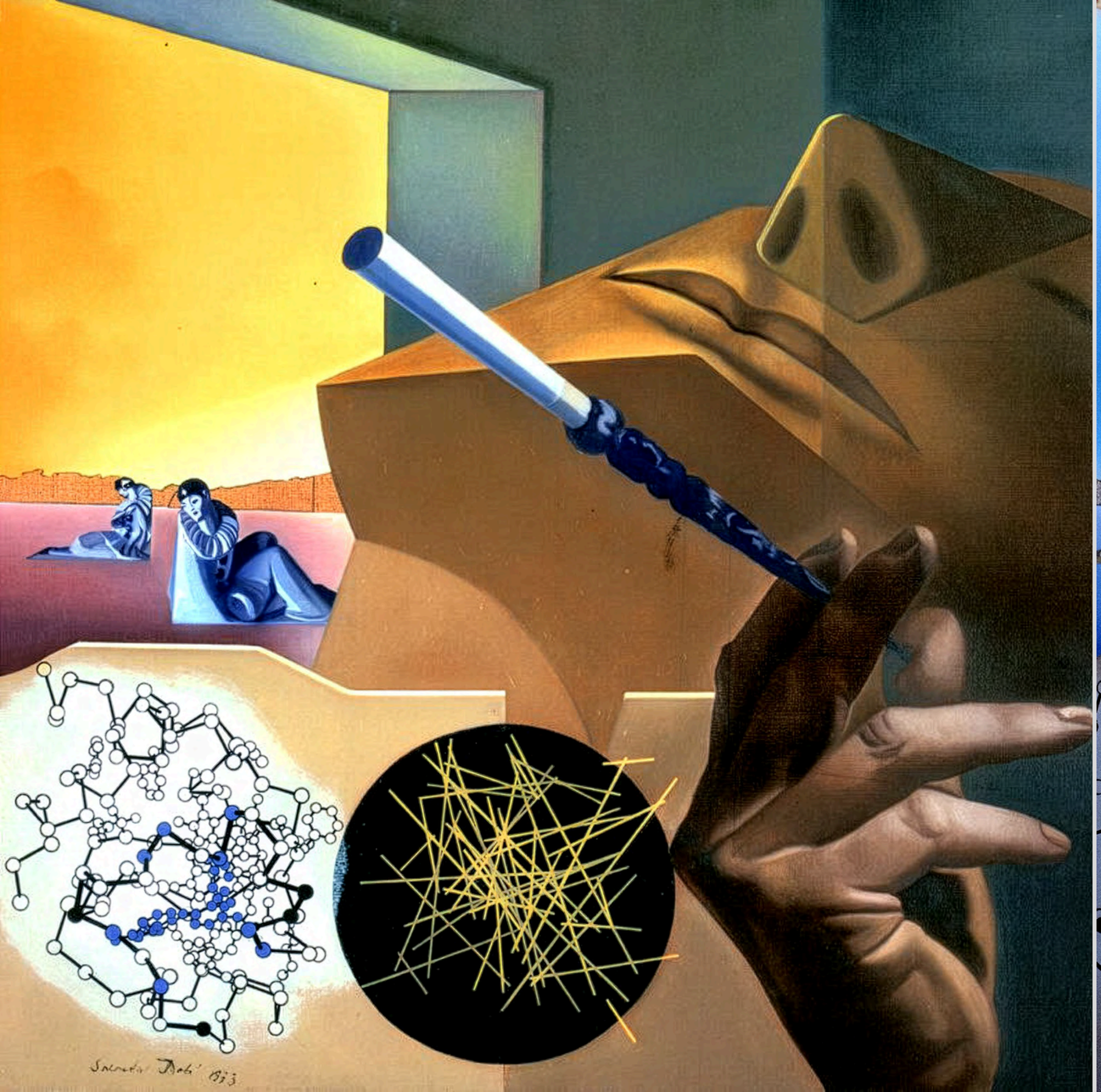
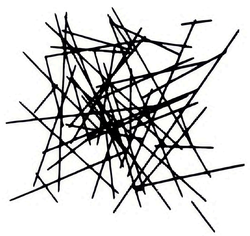
A COMPUTER IN THE DREAM

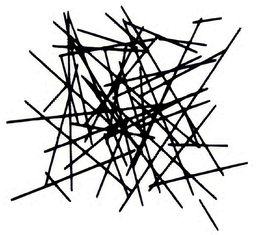
A. MICHAEL NOLL AT THE THRESHOLD OF DALÍ'S THIRD DIMENSION

BY NOAH BOLANOWSKI

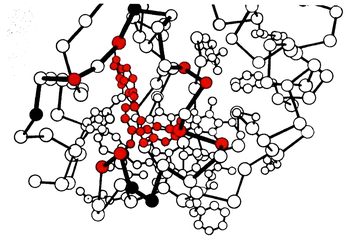


Three-Dimensional Picture Pair of a Random Structure Consisting of 50 Lines Falling at Random Within a Cube by A Michael Noll, 1964



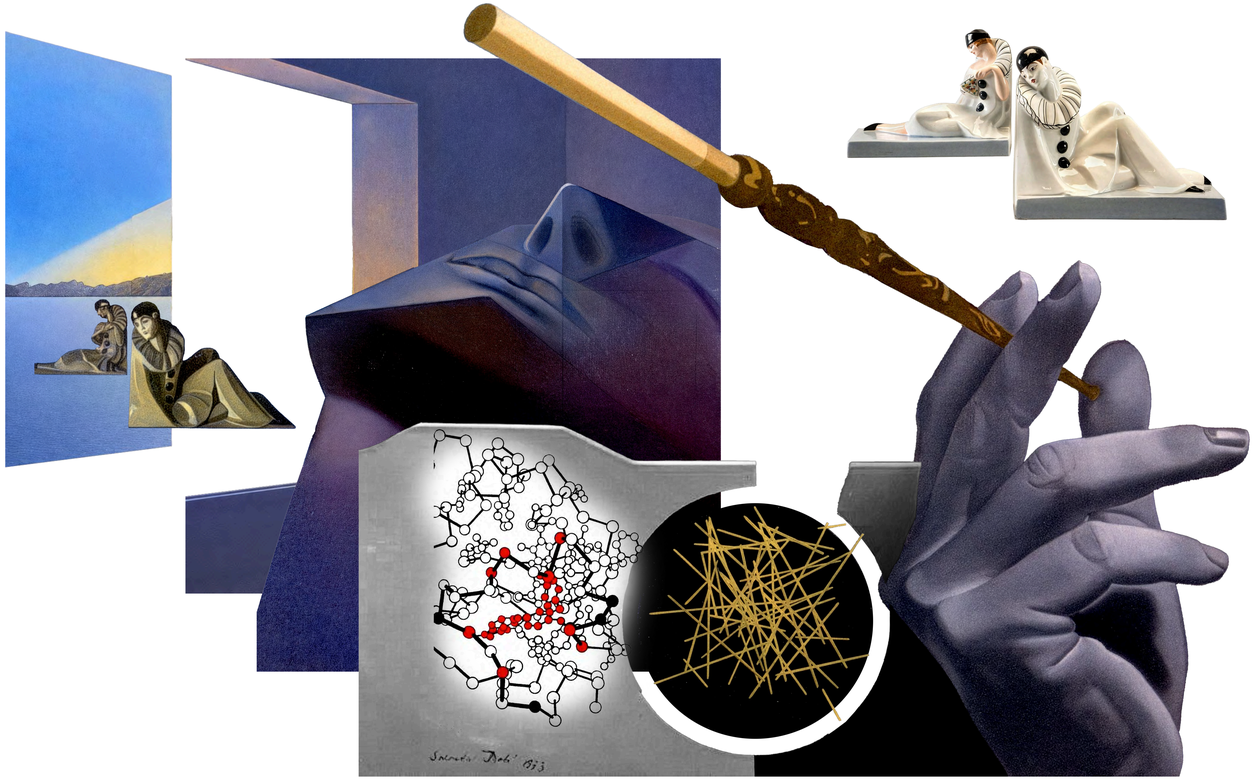


lysozyme–hexasaccharide substrate complex, specifically hen egg-white lysozyme + $(NAG–NAM)_3$



Los tres enigmas gloriosos de Gala (The Three Glorious Enigmas of Gala), 1982

Pierrot and Columbine Book Ends, Stamped Moulin Des Loups & Hamage Orchies France & signed Genvane, c 1930s

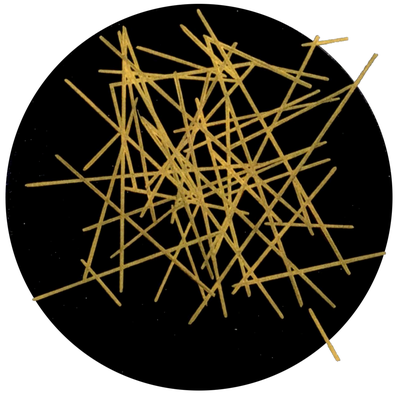


VIEW FROM THE YELLOW ROOM OF SALVADOR DALI'S RESIDENCE IN PORT LLIGAT
BY MARI LUZ VIDAL

Dalí and Gala established their home at Portlligat in 1930, beginning with a modest fisherman's hut that they gradually expanded by acquiring and connecting neighboring structures. Over the following decades, the property evolved into an irregular, labyrinthine house and studio shaped around Dalí's working habits, the Mediterranean light, and views of the surrounding landscape.

The Yellow Room at Portlligat was originally Dalí's first purpose-built studio, added during an expansion of the property in 1935 by local builder Emili Puignau.

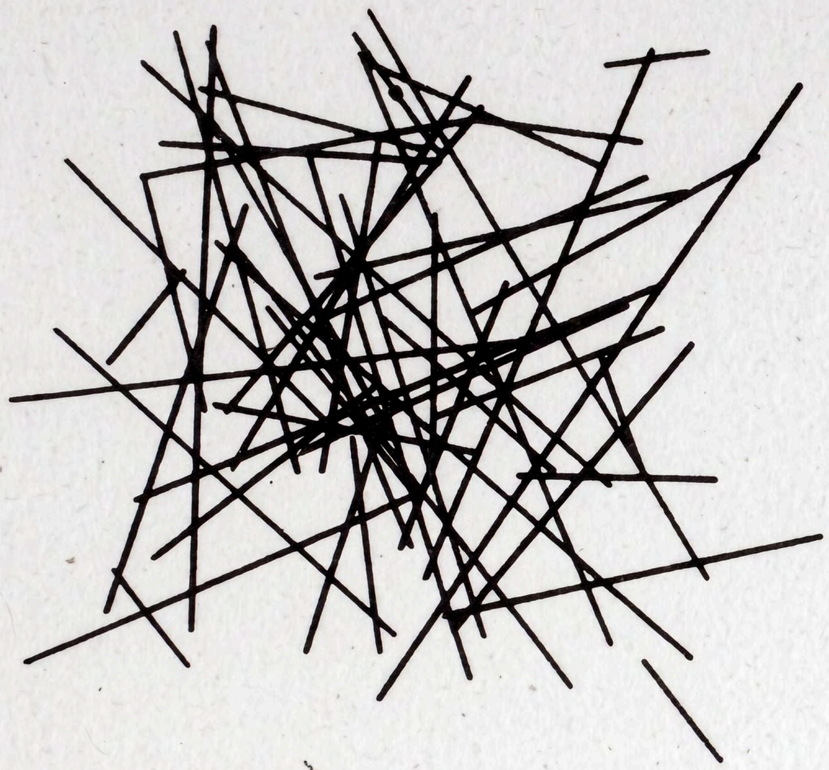
THREE-DIMENSIONAL PICTURE PAIR OF A RANDOM STRUCTURE CONSISTING OF 50 LINES FALLING AT RANDOM WITHIN A CUBE BY A MICHAEL NOLL, 1964

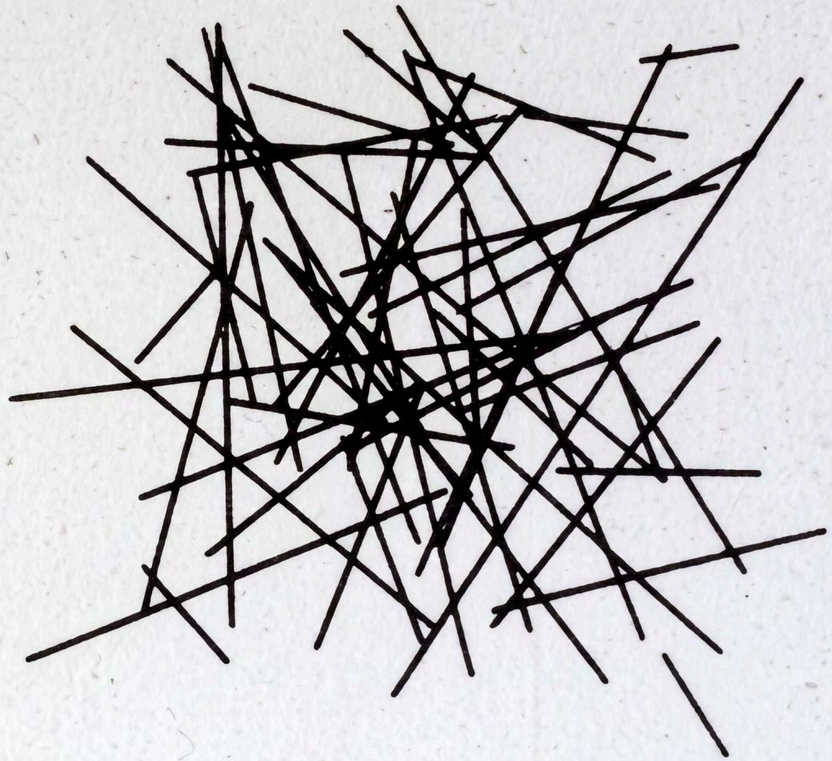


A Michael Noll constructed the work as a virtual three-dimensional object comprising fifty disconnected straight lines distributed within an imaginary cube. Each line was defined by two endpoints whose X, Y, and Z coordinates were chosen through a uniform pseudorandom process, meaning that every position within the cube was equally probable.

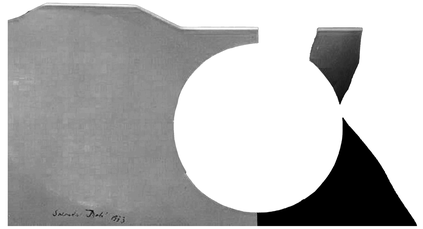
HARDWARE: IBM 7094 Computer, Bell Laboratories
SOFTWARE: FORTRAN
OUTPUT: Stomberg-Carleson SC-4020 Microfilm Recorder

MIKE BARRETT WITH IBM 7094, COLUMBIA UNIVERSITY, C. 1960S





SALVADOR DALI IN PORT LLIGAT
BY HERVÉ DONNEZAN, 1973



PIERROT AND COLUMBINE BOOK ENDS,
STAMPED MOULIN DES LOUPS & HAMAGE
ORCHIES FRANCE & SIGNED GENVANE, C 1930S

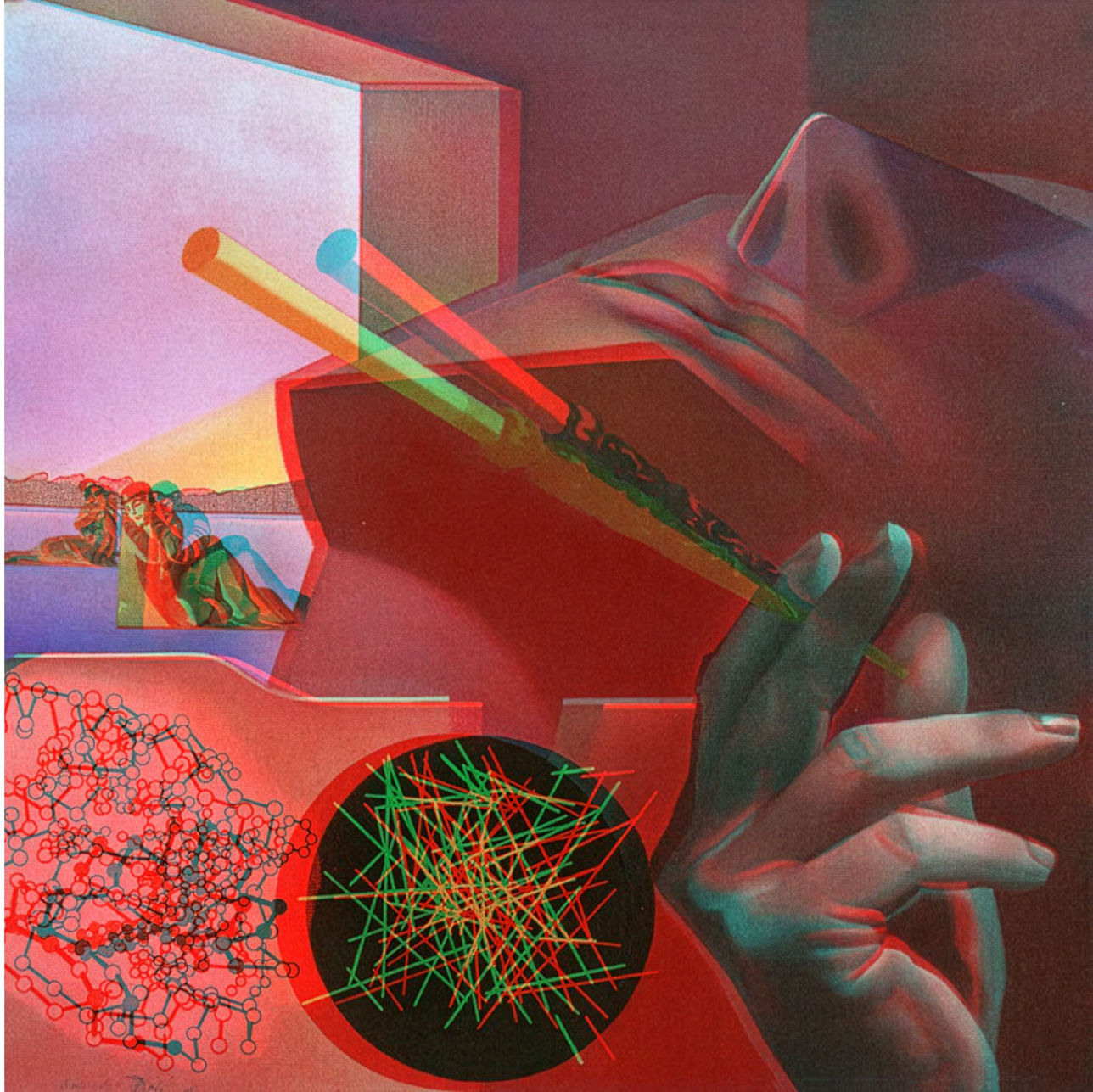
PIERROT AND COLUMBINE ARE TRADITIONAL THEATRICAL CHARACTERS ASSOCIATED WITH THE COMMEDIA DELL'ARTE TRADITION AND ITS LATER FRENCH ADAPTATIONS. PIERROT IS TYPICALLY PORTRAYED AS A MELANCHOLY, LOVESICK CLOWN, WHILE COLUMBINE IS A CLEVER AND INDEPENDENT MAIDSERVANT WHO IS OFTEN THE OBJECT OF HIS UNREQUITED AFFECTION.

THE SLEEPING SMOKER BY SALVADOR DALI,
ANAGLYPH BY JIM MCMANUS, 2021

“During the Surrealism of the 1930s, my painting was pure imaginative automatism. It came all by itself, as though from a spring. Today it is different... I am painting stereoscopic paintings, using two mirrors that reflect two photographs, like the old masters, Vermeer for example. I obtain unique visions and colors. ***To sum it up, formerly I painted the fantasy of reality. Today I paint the reality of fantasy...”***

– Salvador Dali, 1974

Michel, Jacques. “Salvador Dali et son musée.” Le Monde, 3 Oct. 1974



A COMPUTER IN THE DREAM

A. MICHAEL NOLL AT THE THRESHOLD OF DALÍ'S THIRD DIMENSION

BY NOAH BOLANOWSKI

Emerging from Salvador Dali's earliest explorations in achieving multi-dimensional artistic expression, Untitled (The Sleeping Smoker) reflects the perceptual threshold of hypnagogia[1], the process where consciousness transitions to dream state. Acutely mediated by A Michael Noll's[2] computer-generated "Random Line" composition[3], the stereographic painting progresses from material reality into perceptual dissolution, illuminating the hypnagogianic process in the chromatic transmutation achieved through stereographic viewing.

"Look, before, when I was affiliated with the Surrealist movement, it was because I was always trying to decipher my dreams... Now it's different. Today I'm distracted because I'm trying to decipher the hypnagogic images... It's about finding the unconscious in genetics, that is, atavistic memory. In other words, these are images we see fifteen minutes before falling asleep..."

– Salvador Dali, 1973[4]

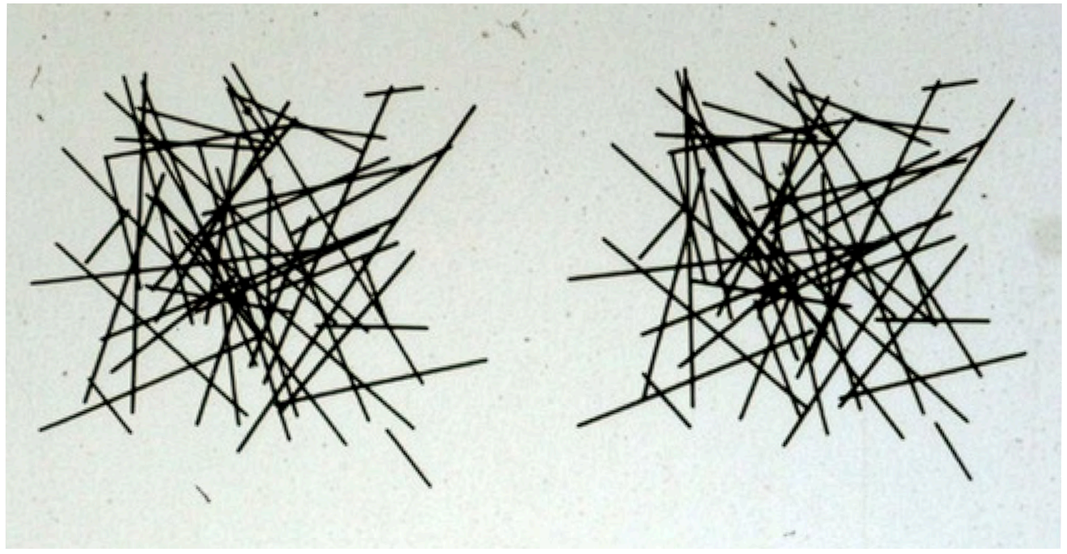
DALI AT CENTRE POMPIDOU, (NOVEMBER 21, 2012–MARCH 25, 2013) BY FRANÇOIS GUILLOT. GETTY IMAGES.

As material coherence dissolves beyond the molecular boundary, the figure's material form re-emerges in a state of architectural entanglement within the surrealist landscape. Depicted in dual shades of gold, A Michael Noll's *Three-Dimensional Picture Pair of a Random Structure Consisting of 50 Lines Falling at Random Within a Cube* (1964) is the only element to be privileged with chromatic stability, existing noticeably within both planes of existence. Implying a deeper understanding of the "virtual" nature of Noll's computer-generated "kinetic sculpture," Dali's appropriation seemingly acknowledges the work as at the precipice of dimensional expression.

In a concurrent trajectory towards multi-dimensional expression of visual art, staged from opposing concentrations within the canonical history, A Michael Noll and Salvador Dali would make considerable innovations in the realization of dimension within their respective mediums.

"Art and technology have been separated for centuries, but Dalí unites them... in three dimensions."

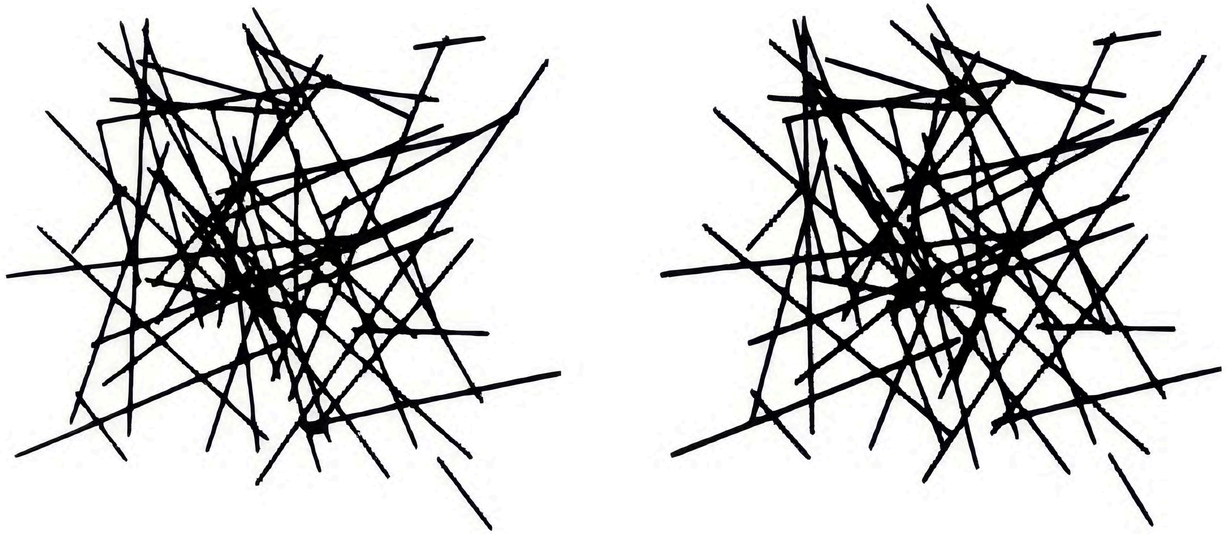
– Salvador Dali, 1973[4]



THREE-DIMENSIONAL PICTURE PAIR OF A RANDOM STRUCTURE CONSISTING OF 50 LINES FALLING AT RANDOM WITHIN A CUBE BY A MICHAEL NOLL, 1964

THREE-DIMENSIONAL PICTURE PAIR OF A RANDOM STRUCTURE CONSISTING OF 50 LINES FALLING AT RANDOM WITHIN A CUBE

BY A MICHAEL NOLL, 1964

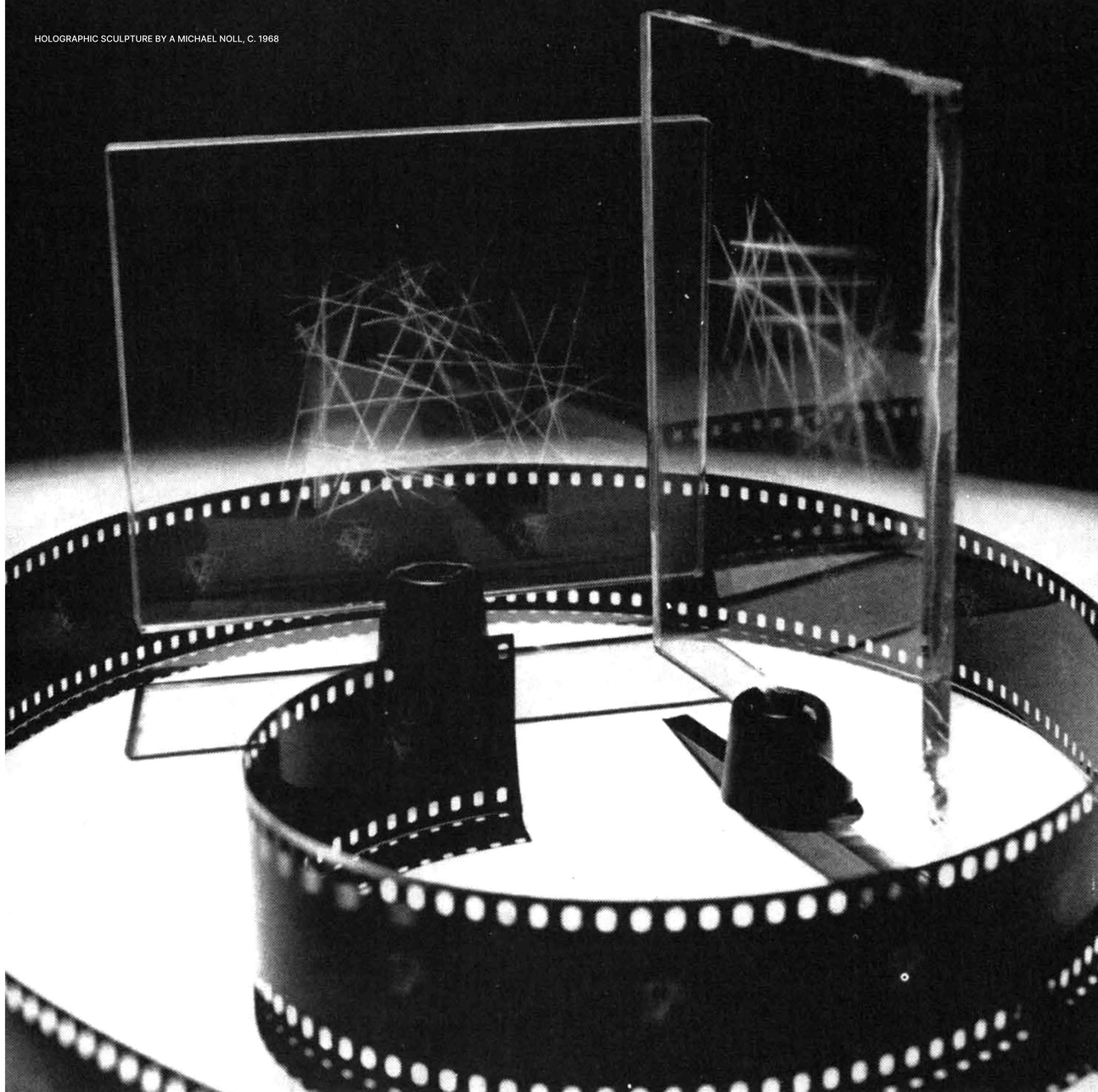


IBM 7090 MAINFRAME COMPUTER AT BELL TELEPHONE LABORATORIES, MURRAY HILL, C. 1960S

"As a child, I had 3D stereographic viewers and enjoyed them very much. It was obvious to me that this technique of separate images for each eye could be adapted to the digital computer and the 35-mm microfilm plotter. I wrote the software to perform the stereographic projections of three-dimensional data and viewed the 35-mm images in a handheld stereo viewer. Some of the data was scientific, such as 3D speech spectrograms. But I also applied the technique to random artistic shapes – a form of computerized 3D sculpture."

– A Michael Noll, 2011

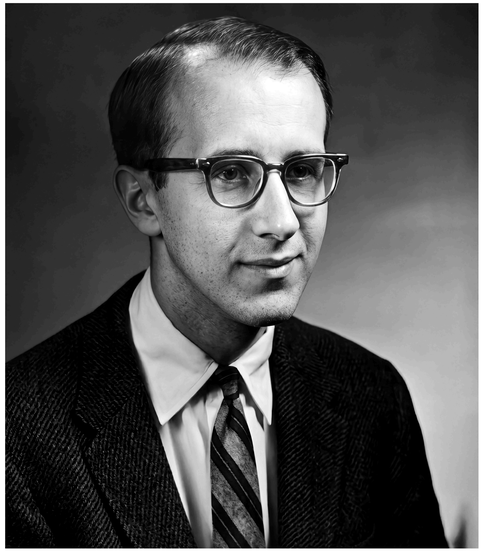
NOLL, A. MICHAEL. "COMPUTER ART AT BELL LABS." PREDELLA, NO. 30, 4 DEC. 2011



HOLOGRAPHIC SCULPTURE BY A MICHAEL NOLL, C. 1968

A researcher and engineer at Bell Telephone Laboratories throughout the early 1960s[5], A Michael Noll's early investigations into the computer's capacity to assist and enhance various forms of creative expression position him resolutely as one of the most palpable influences of the era. Over a period spanning from 1962-68, Noll engaged in a sustained inquiry of dimensional realization using an IBM 7090/7094 mainframe computer and Stromberg Carlson SC-4020 microfilm recorder.[5]

Initially executing computer-generated artworks in two-dimensions[6], by 1964 he had evolved to expressions within the third dimension[7], and by 1965 he had evolved into the fourth dimension of expression.[8] First emerging in March of 1964[7], Three-Dimensional Picture Pair of a Random Structure Consisting of 50 Lines Falling at Random Within a Cube (1964) would be published in several publications throughout the 1970s before ultimately influencing Salvador Dali's stereoscopic painting practice.

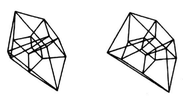


PORTRAIT OF A MICHAEL NOLL, C. 1974.

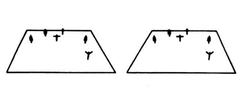
A. Michael Noll (b. 1939) is an American artist, engineer, educator, and pioneering technologist whose early investigations into the computer's capacity to assist and enhance various forms of creative expression position him resolutely as one of the most palpable influences of the era. Creating predominantly abstract forms along a uniquely man & machine structure, Noll's passionate pursuit towards artistic expression would culminate in several pivotal contributions to the genre that can still be felt today. Working within a comparatively limited period of production from 1962-1970, the surviving works that comprise Noll's oeuvre have gained immense value since their inception, both in culture and to the greater discourse of the genre.

With placements in nearly every exhibition of significance throughout the history of digital art, his computer-generated artworks can be found in the collections of the Museum of Modern Art (MoMA), Whitney Museum of American Art, Los Angeles Country Museum of Art (LACMA), Centre Pompidou, and more.

FRAME FROM KINETIC SCULPTURE, 1965



FRAME FROM 4D HYPERCUBE, 1965



FRAME FROM COMPUTER CHOREOGRAPHY, 1965

"Many scientists and artists claim that they visited and met with Dalí at his residence at the St. Moritz Hotel in New York City, perhaps with some influence. I had no contact with Dali, yet my computer art was appropriated directly by him."

– A Michael Noll, 2026

Salvador Dali's pursuit of dimensional expression would emerge within the same era, with the third dimension occupying nearly twenty years of sustained investigation.[10] In 1971, Dali encountered the work of Gerrit Dou,[11] crucially mistaking the near identical painting pairs as being stereoscopic paintings.[12] Not realizing his mistake, he becomes fixated on stereography and identifying Dou's method.[13] Experimenting with Robert Descharnes on stereography as early as 1961,[13] Dali's earliest stereoscopic paintings would all be based on stereographic photographs, each diligently translated into painting.[13]

PHOTOGRAPH BY MARC LACROIX OF SALVADOR DALI ALONGSIDE STEREOSCOPIC PAINTINGS IN PROGRESS, C. 1970S

PHOTOGRAPH BY MARC LACROIX OF SALVADOR DALI ALONGSIDE STEREOSCOPIC PAINTINGS IN PROGRESS, C. 1972-73.

While Salvador Dali's first completed stereoscopic painting is considered to be *Dalí Seen from the Back Painting Gala from the Back Eternalized by Six Virtual Corneas Provisionally Reflected by Six Real Mirrors* (1972-73), the inception of the practice appears to actually emerge in *The Sleeping Smoker* (1973). Executed just prior, as evidenced by the near-completed state of the work depictured in a photograph by Marc Lacroix, the practice would be inspired by the artist's discovery of computer-generated stereographic artworks on the pages of a scientific periodical.[13]

Likely discovering the work of A Michael Noll,[15] found on the pages of Jasia Reichardt's Cybernetics, Art and Ideas (1971),[16] Dali would direct his studio assistant, Louis Markoya, to find more stereographic references to assemble into a referential corpus.[13] Purchasing his own Stereorealist camera, Markoya would photograph a broad spectrum of objects at the request of Dali, to be delivered, developed, and affixed to stereographic viewing cards.[17]

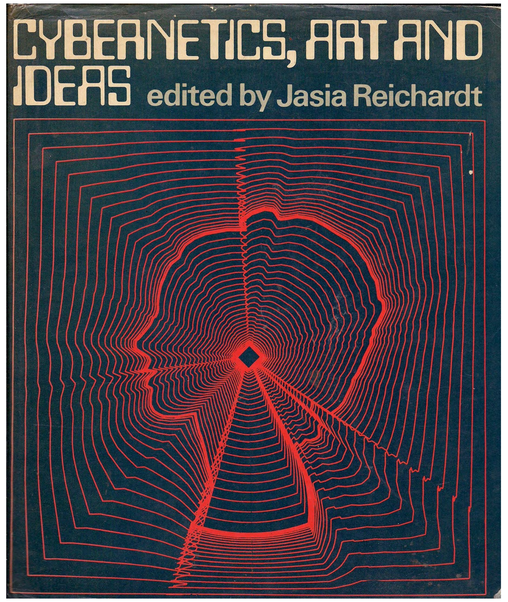
"...I was digging up some stereo images from computer generated periodicals and you couldn't find... much, there wasn't a lot available and... started ordering everything I could find, and most of the stuff that was stereo at the time was molecules..."

– Louis Markoya, 2021[17]

To execute a stereoscopic collage, Dali would select and view each reference through a stereoscopic viewing device, curating along both aesthetic and dimensional depth. Once selected for inclusion, the photograph would be enlarged and outlined with pinholes before, each filled in pencil and connected on canvas.[17]

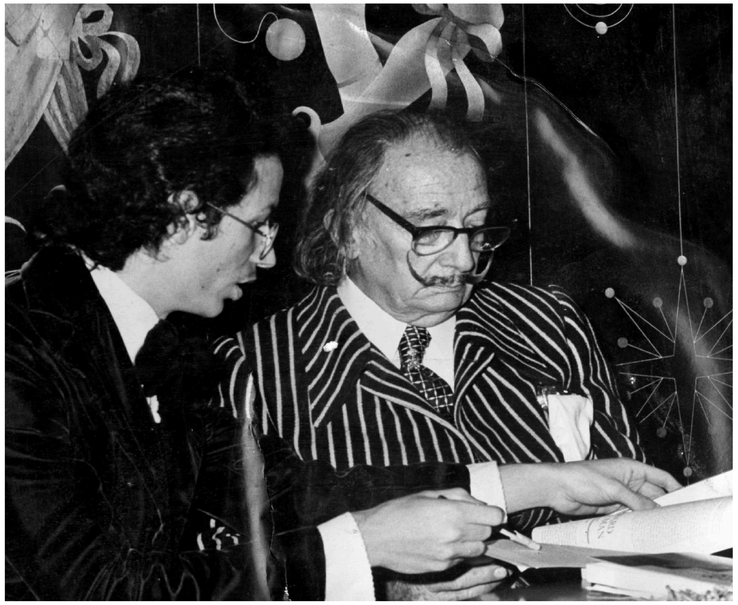
"...working from a sketch, Dalí had independent elements, often disparate from one another, photographed, drawn, and spatialized in order to bring them together on the canvases, thereby creating the 'first stereoscopic collage.'"

– Robert Descharnes, 1980[10]

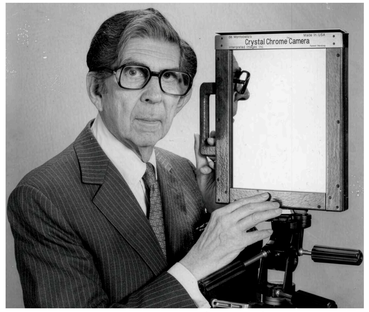


CYBERNETICS, ART AND IDEAS, EDITED BY JASIA REICHARDT, STUDIO VISTA, 1971.

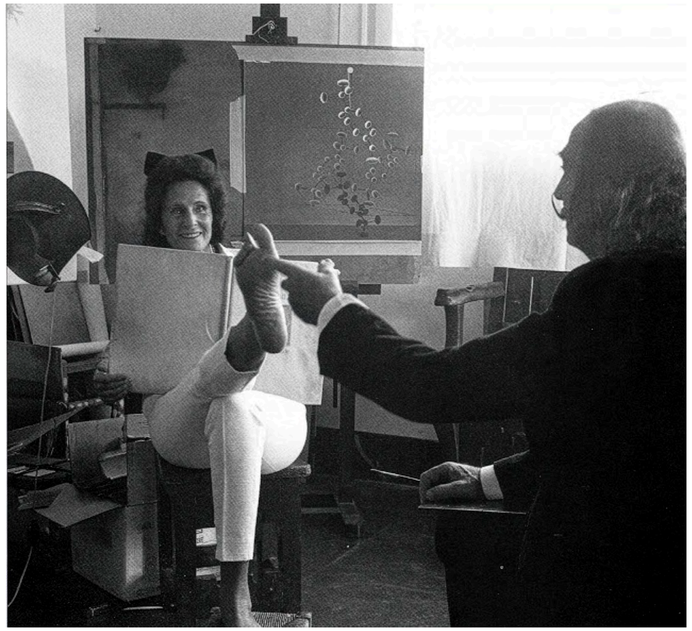
SALVADOR DALI PHOTOGRAPHED WITH SCIENTIFIC AMERICAN MAGAZINE, JANUARY 1970. GETTY IMAGES.


LOUIS MARKOYA AND SALVADOR DALI IN 1974, PHOTOGRAPH BY KEVIN CARBONE.

MARC LACROIX AND SALVADOR DALI, C. 1973.



ROGER LANNES DE MONTEBELLO (1908–1986), 1981. GALLERY 98.



ORIGINAL MARC LACROIX PHOTOGRAPH OF “GALAS FOOT,” C. 1974

“EDITED” MARC LACROIX PHOTOGRAPH OF “GALAS FOOT,” C. 1974

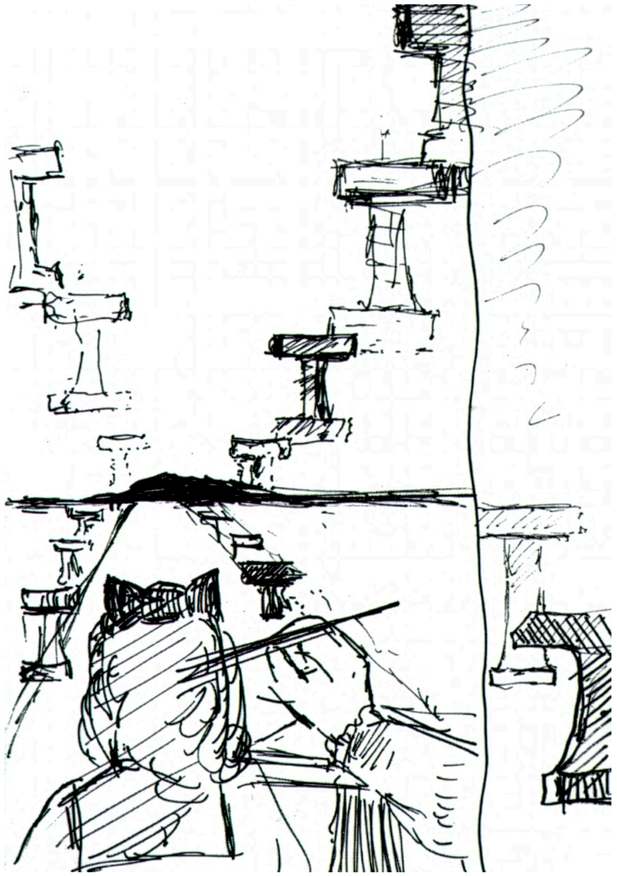
GALAS FOOT (RIGHT PANEL), C. 1974

ORIGINAL MARC LACROIX PHOTOGRAPH OF
“DALÍ SEEN FROM THE BACK PAINTING GALA FROM THE BACK ETERNALIZED BY SIX VIRTUAL CORNEAS PROVISIONALLY REFLECTED BY SIX REAL MIRRORS,” C. 1972

ORIGINAL MARC LACROIX PHOTOGRAPH OF DALI PAINTING
“DALÍ SEEN FROM THE BACK PAINTING GALA FROM THE BACK ETERNALIZED BY SIX VIRTUAL CORNEAS PROVISIONALLY REFLECTED BY SIX REAL MIRRORS,” 1972-73

DALÍ SEEN FROM THE BACK PAINTING GALA FROM THE BACK ETERNALIZED BY SIX VIRTUAL CORNEAS PROVISIONALLY REFLECTED BY SIX REAL MIRRORS, 1972-73

ORIGINAL MARC LACROIX PHOTOGRAPH OF “THE CHAIR” C. 1975



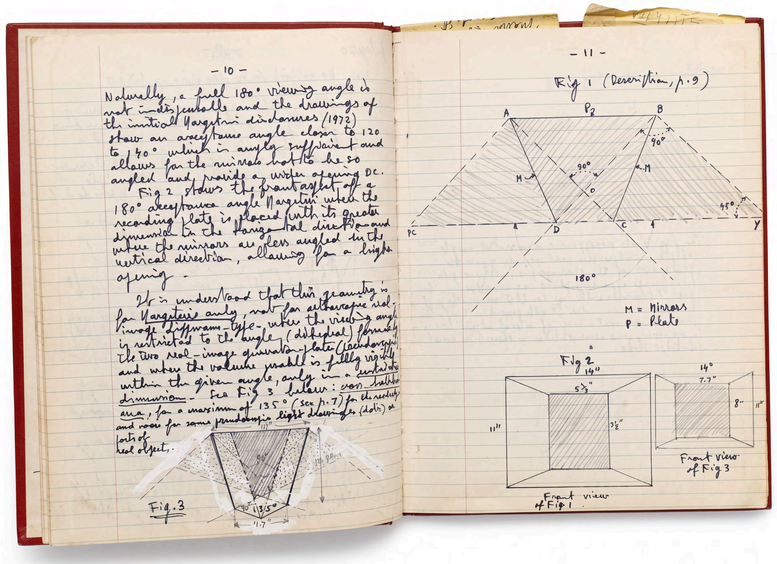
STUDY FOR “THE CHAIR,” C. 1975

THE CHAIR, C. 1975

As a collective, the stereoscopic paintings are characterized through variations in color, values, and lighting in an acutely creative exploration of third dimensional expression.[11] Through use of opposing colors in particular, Dali pioneers a “new way of mixing color” – a new chromatic hue only experienced through stereoscopic reflection.[17] Presented in an adaptation of the Wheatstone Mirror Stereoscope, reconceptualized for Dali by Roger Lannes de Montebello, the stereoscopic paintings would be intended to be exhibited in a “W” configuration, with each canvas on opposing ends intersected by a mirrored “V.” In a pioneering presentation of contemporary painting, viewers were encouraged to place their nose close to the intersection of the mirrors to experience the work in its full third dimensional form.

“At the same time, thanks to a system of mirrors developed by Roger de Montebello, I wanted to extend American Hyperrealism—which is truly glorious at present—by adding the third dimension to these images, perfectly and hyperaesthetically copied from photographs.”

– Salvador Dali, 1973[10]



A 1974 DE MONTEBELLO TECHNICAL STUDY FOR A TWO-PLATE, TWO-MIRROR STEREOSCOPIC VIEWING SYSTEM, LIKELY RELATED TO THE MIRROR STEREOSCOPE DEVELOPED FOR DALÍ. GALLERY 98.

EXAMPLE OF THE STEREOSCOPE SALVADOR DALI WOULD USE TO PREVIEW STEREOGRAPHIC ELEMENTS.

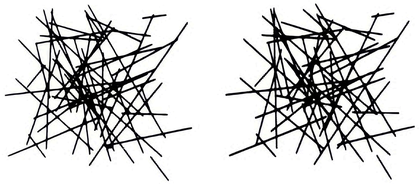
While Salvador Dali would go on to appropriate several computer-generated artworks from Bell Laboratories by Leon D. Harmon and Bela Julesz, A Michael Noll’s appropriation within The Sleeping Smoker would be the earliest and most influential of the celebrated artist's oeuvre. More than an extant exploration, it would directly influence a practice sustained for nearly a decade and result in some of Dali’s most significant contributions to the canonical history of art.

“Painting has tried to copy real life — but there is no depth. Now we create space. Perfection is possible by this method: two asymmetric images becoming one singular. This is like hermaphrodite — one part is girl, one part is man, and the fusion of the two creates Hy-per-e-stro-stopic!”

– Salvador Dali, 1978[20]

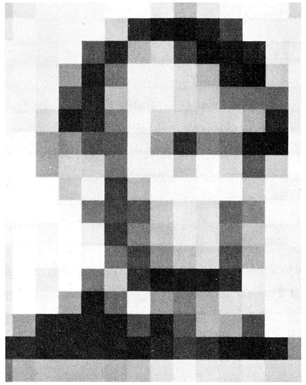
THE SLEEPING SMOKER (1973), SHOWN AS REPLICA IN EXHIBITION AT CENTRE POMPIDOU, 2013.

SALVADOR DALI PRESENTS HIS STEREOSCOPY WORK, ON APRIL 17, 1975 AT THE NIXON GALLERY
GETTY IMAGES.

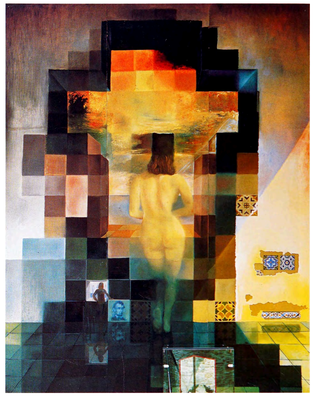


THREE-DIMENSIONAL PICTURE PAIR OF A RANDOM STRUCTURE CONSISTING OF 50 LINES FALLING AT RANDOM WITHIN A CUBE BY A MICHAEL NOLL, 1964

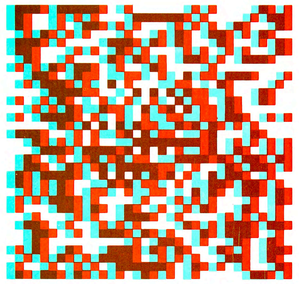
UNTITLED (THE SLEEPING SMOKER), 1973



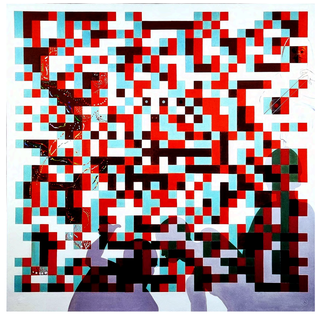
BLOCK PORTRAIT OF ABRAHAM LINCOLN BY LEON D HARMON, 1970



GALA CONTEMPLATING THE MEDITERRANEAN SEA WHICH AT TWENTY METRES BECOMES THE PORTRAIT OF ABRAHAM LINCOLN – HOMAGE TO ROTHKO (FIRST VERSION), 1974–1975



33X33 RANDOM-DOT STEREOGRAM BY BELA JULESZ, 1971

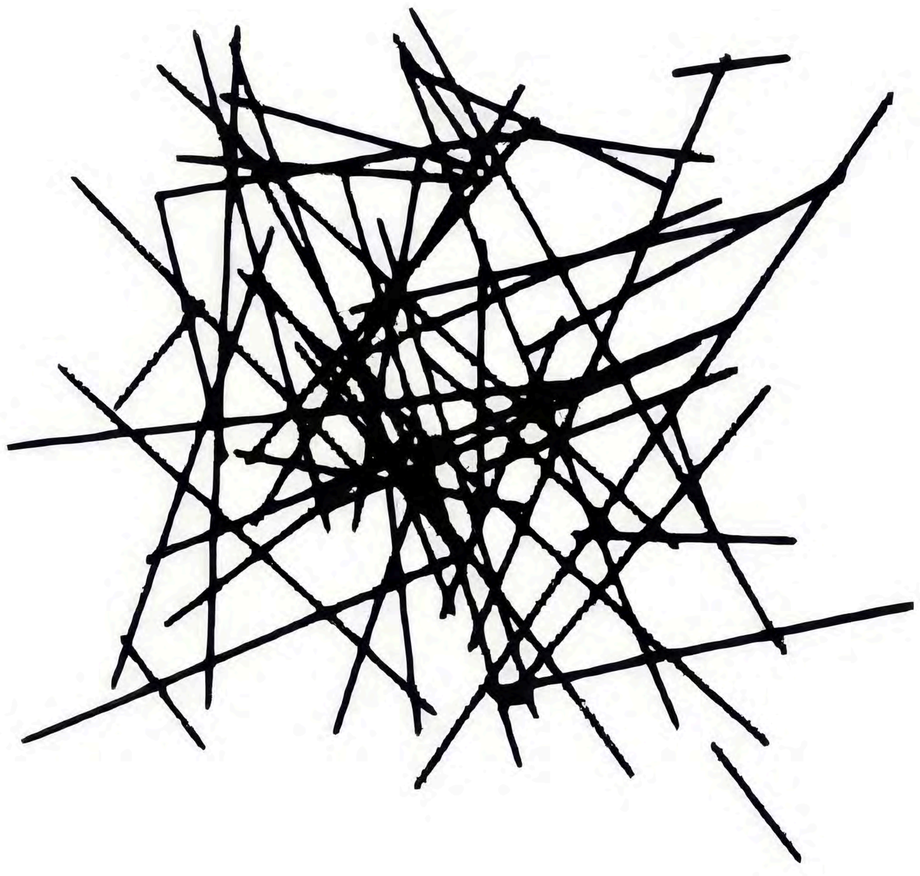


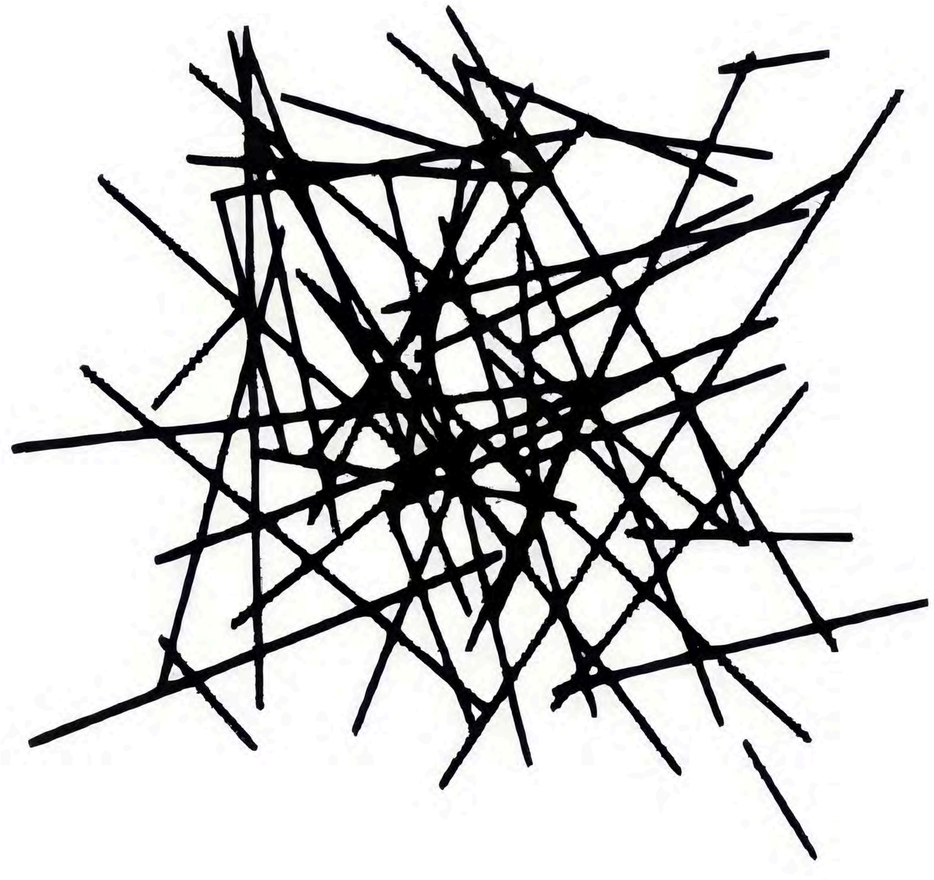
CYBERNETIC ODALÍSQUE - HOMAGE TO BELA JULESZ, 1978

CITATIONS:

[1]Oliva, Alberto. “Dali, mistificador ou gênio?” Interview with Salvador Dalí. O Globo Domingo, 18 Mar. 1973.
[2]A. Michael Noll (b. 1939) is an American artist, engineer, educator, and pioneering technologist whose early investigations into the computer’s capacity to assist and enhance various forms of creative expression position him resolutely as one of the most palpable influences of the era. Creating predominantly abstract forms along a uniquely man & machine structure, Noll’s passionate pursuit towards artistic expression would culminate in several pivotal contributions to the genre that can still be felt today. Working within a comparatively limited period of production from 1962-1970, the surviving works that comprise Noll’s oeuvre have gained immense value since their inception, both in culture and to the greater discourse of the genre.
[3]Three-Dimensional Picture Pair of a Random Structure Consisting of 50 Lines Falling at Random Within a Cube by A Michael Noll, 1964
[4]Oliva, Alberto. “Dali, mistificador ou gênio?” Interview with Salvador Dalí. O Globo Domingo, 18 Mar. 1973.
[5]Noll, A. Michael. Memories: A Personal History of Bell Telephone Laboratories. Quello Center, Michigan State University, 6 Aug. 2015.
[6]Noll, A. Michael. Patterns by 7090. Technical Memorandum MM-62-1234-14, Bell Telephone Laboratories, 28 Aug. 1962.
[7]Noll, A. Michael. Stereographic Projections by Digital Computer. Technical Memorandum MM-64-1234-2, Bell Telephone Laboratories, 27 Mar. 1964.
[8]Noll, A. Michael. “Computer-Generated Three-Dimensional Movies.” Computers and Automation, vol. 14, no. 11, Nov. 1965, pp. 20–23.
[9]Noll, A. Michael. “The Digital Computer as a Creative Medium.” Cybernetics, Art and Ideas, edited by Jasia Reichardt, Studio Vista, 1971, pp. 143–64.
[10]Descharnes, Robert. “Dalí, l’image et l’espace.” Salvador Dalí: rétrospective 1920–1980, 18 décembre 1979–21 avril 1980, Centre Georges Pompidou, Musée national d’art moderne, Centre Georges Pompidou, 1980, pp. 390–402.
[11]Descharnes, Robert. Salvador Dali. Translated by Eleanor R. Morse, Harry N. Abrams, 1976, p. 124.
[12]Wallis, Jonathan. “Double Deceptions: Salvador Dalí’s Stereoscopic Paintings and the Influence of Gerrit Dou.” The Papers of Surrealism, no. 11, Spring 2015.
[13]Markoya, Louis. “An Interview with Dalí’s Protégé, Louis Markoya.” NYSA Presents!, season 3, episode 9, NYSA, 3 Apr. 2021. Vimeo
[14]Lacroix, Marc, and Thérèse Lacroix. Dalí, Lacroix, Gala: El privilegio de la intimidad = Le privilège de l’intimité = The Privilege of Intimacy. Fundación Eugenio Granell, 2000
[15]While not an absolute certainty, Noll’s stereographic work would be published extensively in the years prior and throughout the period in question.
[16]In a conversation between A Michael Noll and scholar Anna Pou Van Den Bossche dated August 15, 2026, Pou confirms Reichardt's Cybernetics, Art and Ideas (1971) is held in Dali’s library, “I have had it [in] my own hands!”
[17]Markoya, Louis. “Louis Markoya Artist & Protege of Salvador Dali.” Interview by Johnny Laser. YouTube, uploaded by New York Stereoscopic Association, 22 Apr. 2021
[18]AFP. “Spanish Artist Salvador Dali Presents His Stereoscopy Work, on April 17, 1975 at the Nixon Gallery.” Getty Images, 17 Apr. 1975
[19]Fundació Gala-Salvador Dalí. “Dalí Seen from the Back Painting Gala from the Back Eternalized by Six Virtual Corneas Provisionally Reflected by Six Real Mirrors. Stereoscopic Work.” Catalogues Raisonnés, cat. no. P 853
[20]Peck, Abe. “Hello, Dali: A Conversation with the Artist.” Houston Chronicle, 8 May 1978, sec. 3, p. 12.

Noah Bolanowski is a digital art historian, researcher, and strategic advisor dedicated to the provenance, preservation, and canonization of electronic art. Described as one of the “very few trusted sources of the canonical history of the art,” his research has helped illuminate overlooked chapters of digital art history, including Andy Warhol’s Deborah Harry and accompanying works produced on the Commodore Amiga in 1985. His experience in the institutional integration of digital art includes landmark museum initiatives as former Managing Director of 1OF1 Collection, from Guggenheim Bilbao’s record-setting presentation of Refik Anadol’s in situ to the historic donation of CryptoPunks and Chromie Squiggles to the permanent collection of The Museum of Modern Art. Across research and advisory work, he focuses on the systems that give digital art lasting cultural value: provenance, preservation, institutional context, and historical clarity.





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